MATERIAL SAFETY DATA SHEET

BAYER CORPORATION
AGRICULTURE DIVISION
P.O. Box 4913 Hawthorn Road
Kansas City, MO 64120-0013

TRANSPORTATION EMERGENCY
CALL CHEMTREC: 800-424-9300
DISTRICT OF COLUMBIA: 202-483-7616

NON-TRANSPORTATION
BAYER EMERGENCY PHONE...: (800) 414-0244
BAYER INFORMATION PHONE.: (800) 842-8020

1. CHEMICAL PRODUCT IDENTIFICATION:

PRODUCT NAME.....: Guthion 2L
PRODUCT CODE.....: 11016
CHEMICAL FAMILY.....: Organophosphorous Insecticide
CHEMICAL NAME.....: O,O-Dimethyl S-[(4-oxo-1,2,3-benzotriazin-3 (4H)-yl)methyl] phosphorodithioate
SYNONYMS.....: Azinphos-methyl, GUSATHION-M
FORMULA.....: C10 H12 N3 O3 P S2

2. COMPOSITION/INFORMATION ON INGREDIENTS:

INGREDIENT NAME /CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
***** HAZARDOUS INGREDIENTS *****		
GUTHION (azinphos-methyl) 86-50-0	OSHA : .20 mg/m3 TWA (Skin) ACGIH: .20 mg/m3 TWA (Skin)	22 %
Ingredient 1967 Specific chemical identity is withheld as a trade secret.	OSHA : Not Established ACGIH: Not Established	5-10%
Ingredient 1493 Specific chemical identity is withheld as a trade secret.	OSHA : Not Established ACGIH: Not Established	50-60 %

Ingredient 1966 (at 5-10%) or Ingredients 1950 and 1832 (at 1-5% each) may be contained in this product as alternates to Ingredient 1967.

2. COMPOSITION/INFORMATION ON INGREDIENTS (Continued)

INGREDIENT NAME /CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
Ingredient 1418 Specific chemical identity is withheld as a trade secret.	OSHA : Not Established ACGIH: Not Established	5-10 %
Naphthalene 91-20-3	OSHA : 10.00 ppm TWA ACGIH: 10.00 ppm TWA	5-10 %

3. HAZARDS IDENTIFICATION:

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* EMERGENCY OVERVIEW *
*
* DANGER! Toxic; Combustible; Color: Brown; Form: Liquid; *
* Odor: Sulfur compounds; Organophosphate Insecticide - *
* Cholinesterase Inhibitor; Harmful if inhaled or ingested; *
* Harmful if absorbed through skin; Vapors or mist may be a *
* fire and explosion hazard when exposed to high temperature *
* or ignition. *
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POTENTIAL HEALTH EFFECTS:

ROUTE(S) OF ENTRY.....: Inhalation; Skin Contact; Skin Absorption; Eye Contact

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:

ACUTE EFFECTS OF EXPOSURE.....: Inhalation, dermal absorption or ingestion of this material may result in systemic intoxication due to inhibition of the enzyme cholinesterase. The sequence of development of systemic effects varies with the route of entry, and the onset of symptoms may be delayed up to 12 hours. First symptoms of poisoning may be nausea, increased salivation, lacrimation, blurred vision and constricted pupils. Other symptoms of systemic poisoning include vomiting, diarrhea, abdominal cramping, dizziness and sweating. After inhalation, respiratory symptoms like tightness of chest, wheezing, and laryngeal spasms, may be pronounced at first. If the poisoning is severe, then symptoms of weakness, muscle twitching, confusion, ataxia, slurred speech, convulsions, low blood pressure, cardiac irregularities, loss of reflexes and coma may occur. In extreme cases, death may occur due to a combination of factors such as respiratory arrest, paralysis of respiratory muscles or intense bronchoconstriction. Complete symptomatic recovery from sublethal poisoning usually occurs within one week once the source of exposure is completely removed. Based on EPA Toxicity Category criteria, this product is moderately toxic by the oral and dermal routes of exposure. Although dermal sensitization studies have not been conducted on this formulation, the active ingredient, azinphos-methyl, is a positive dermal sensitizer.

3. HAZARDS IDENTIFICATION (Continued)

This product contains aromatic hydrocarbon solvents. High vapor concentrations can be irritating to the eyes, nose and throat, and may cause headaches, dizziness, nausea, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death.

CHRONIC EFFECTS OF EXPOSURE...: Cholinesterase inhibition sometimes persists for 2-6 weeks, thus repeated exposure to small amount of this material may result in an unexpected cholinesterase depression causing symptoms such as malaise, weakness, and anorexia that resemble other illnesses such as influenza. Exposure to a concentration that would not have produced symptoms in a person that was not previously exposed may produce severe symptoms of cholinesterase inhibition in a previously exposed person. Repeated skin contact may result in defatting of the skin by the solvents in the product which can lead to redness and irritation of the skin. Chronic overexposure to these solvent components may cause mucous membrane irritation, nausea, headache, loss of appetite, weakness and alcohol intolerance.

CARCINOGENICITY.....: This product is not listed by NTP, IARC or regulated as a carcinogen by OSHA.

MEDICAL CONDITIONS

AGGRAVATED BY EXPOSURE.....: No specific medical conditions are known which may be aggravated by exposure to the active ingredient in this product. However, any disease, medication or prior exposure which reduces normal cholinesterase activity may increase susceptibility to the toxic effects of the active ingredient. In addition, certain pre-existing skin disorders may be aggravated by exposure to this product due to the solvent components.

4. FIRST AID MEASURES:

FIRST AID FOR EYES.....: Hold eyelids open and flush with copious amounts of water for 15 minutes. Call a physician if irritation develops or persists after flushing.

FIRST AID FOR SKIN.....: Remove contaminated clothing. Wash affected areas immediately with soap and water. Get medical attention if irritation develops and persists. If signs of intoxication (poisoning) occur, get medical attention immediately.

FIRST AID FOR INHALATION: First, remove victim to fresh air or uncontaminated area. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention as soon as possible.

FIRST AID FOR INGESTION.: This product could cause chemical pneumonitis through aspiration of the product into the lungs following accidental ingestion. If ingestion is suspected, contact physician or poison control center immediately. Seek medical assistance as soon as possible. Drink promptly a large quantity of milk, or if milk is not available, large quantities of water. DO NOT induce vomiting. Avoid alcohol. Do not attempt to give

anything by mouth to an unconscious person.

NOTE TO PHYSICIAN.....: This product contains the organophosphorus insecticide, azinphos-methyl, a cholinesterase inhibitor. Cholinesterase inhibition results in stimulation of the central nervous system, the parasympathetic nervous system and the somatic motor nerves. If symptoms of organophosphate poisoning are present, the administration of atropine sulfate is indicated. Administer atropine sulfate in large, therapeutic doses. In mild cases, start treatment by giving 1-2 mg of atropine intravenously every 15 minutes until signs of atropinization appear (dry mouth, flushing, and dilated pupils if pupils were originally pinpoint). In severe cases, start treatment by giving 2-4 mg intravenously every 5-10 minutes until fully atropinized. Dosages for children should be appropriately reduced. 2-PAM is also antidotal and may be used in conjunction with atropine. Do not give morphine. Watch for pulmonary edema which may develop in serious cases of poisoning even after 24 hours. At first sign of pulmonary edema, place patient in oxygen tent and treat symptomatically. In case of poisoning, it is also requested that Bayer Corp., Agriculture Division, Kansas City, MO, be notified. Telephone: 1-800-414-0244.

5. FIRE FIGHTING MEASURES:

FLASH POINT.....: 156 F
FLAMMABLE LIMITS:
UPPER EXPLOSIVE LIMIT (UEL)(%): Not established
LOWER EXPLOSIVE LIMIT (LEL)(%): Not established
EXTINGUISHING MEDIA.....: Water; Carbon Dioxide; Dry Chemical; Foam
SPECIAL FIRE FIGHTING PROCEDURES: Keep out of smoke, cool exposed containers with water spray. Fight fire from upwind position. Use self-contained breathing equipment. Contain runoff by diking to prevent entry into sewers or waterways. Equipment or materials involved in pesticide fires may become contaminated.
UNUSUAL FIRE / EXPLOSION HAZARDS: Gas Explosion Hazard: During the routine handling of this material there should be little risk of a gas explosion. However, this material decomposes rapidly above 150 F with a strong odor and dense smoke. The decomposition gases in air may be flammable. If a large vapor or smoke cloud develops, turn off any devices that may cause spark and leave the area until the cloud dissipates. See Section 10 for stability and reactivity information. Additional information is available upon request.

6. ACCIDENTAL RELEASE MEASURES:

SPILL OR LEAK PROCEDURES.....: Isolate area and keep unauthorized people away. Do not walk through spilled material. Avoid breathing vapors and

skin contact. Remove sources of ignition if combustible or flammable vapors may be present and ventilate area. Wear proper protective equipment. Dike contaminated area with absorbent granules, soil, sand, etc. If large spill, material should be recovered. Small spills can be absorbed with absorbent granules, spill control pads, or any absorbent material. Carefully sweep up absorbed spilled material. Place in covered container for reuse or disposal. Scrub contaminated area with detergent and bleach solution and/or detergent and lye in water solution. Repeat. Rinse with water. Use dry absorbent material such as clay granules to absorb and collect wash solution for proper disposal. Contaminated soil may have to be removed and disposed. Do not allow material to enter streams, sewers, or other waterways or contact vegetation.

7. HANDLING AND STORAGE:

STORAGE TEMPERATURE(MIN/MAX): 45 F/ 30-day average not to exceed 100 F
SHELF LIFE.....: Time/temperature-dependent. Specific information is available on request.
SPECIAL SENSITIVITY.....: Heat, Moisture
HANDLING/STORAGE PRECAUTIONS: Store in a cool, dry and well-ventilated area away from heat sources. Store in an area designated specifically for pesticides. Do not store near any materials intended for use or consumption by humans or animals.

8. PERSONAL PROTECTION:

EYE PROTECTION REQUIREMENTS.....: Goggles or face shield should be used when needed to prevent liquid splashes from getting into the eyes.
SKIN PROTECTION REQUIREMENTS.....: Avoid skin contact. Wear long sleeves and trousers and additional protective clothing when needed to prevent dermal exposure.
HAND PROTECTION REQUIREMENTS.....: Chemical-resistant gloves such as natural rubber.
VENTILATION REQUIREMENTS.....: Maintain exposure levels below the applicable exposure limits through the use of general and local exhaust ventilation.
RESPIRATOR REQUIREMENTS.....: When respiratory protection is needed based on the conditions of use, wear a NIOSH-approved organic vapor respirator with particulate pre-filter.
MEDICAL SURVEILLANCE.....: Plasma and/or red blood cell cholinesterase activity can be used to detect excessive absorption of Guthion. It is preferable to establish a pre-exposure baseline value for best comparisons. Contact Bayer Corporation, Agriculture Division, for additional information. If significant cholinesterase depression occurs, no further exposure should be allowed until cholinesterase values return to

normal.
ADDITIONAL PROTECTIVE MEASURES.....: Clean water should be available for washing in case of eye or skin contamination. Educate and train employees in safe use of the product. Follow all label instructions. Launder clothing after use. Wash thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES:

PHYSICAL FORM.....: Liquid
COLOR.....: Brown
ODOR.....: Sulfur compounds
MOLECULAR WEIGHT.....: 317.3 (for GUTHION/azinphos-methyl)
BOILING POINT.....: Not established
MELTING/FREEZING POINT....: 45 F (freeze point)
SOLUBILITY IN WATER .....: Negligible (for GUTHION/azinphos-methyl)
SPECIFIC GRAVITY .....: 1.09 @ 20C/20C
BULK DENSITY.....: Not applicable
% VOLATILE BY VOLUME.....: Not established
VAPOR PRESSURE .....: 1.6 x 10 -6 mm Hg @ 20 C (for GUTHION/azinphos-methyl)
VAPOR DENSITY .....: Not established (Air = 1)

10. STABILITY AND REACTIVITY:

STABILITY.....: This is a stable material.
HAZARDOUS POLYMERIZATION...: Will not occur.
INCOMPATIBILITIES.....: Strong oxidizing agents, alkalines
INSTABILITY CONDITIONS.....: Sustained temperatures above 100 F
DECOMPOSITION PRODUCTS.....: Proposed compounds under severe conditions, such as fire or temperatures above 150 F: H2S, CO, dimethyl sulfide, methyl mercaptan, SO2. See Section 5 for additional information.

11. TOXICOLOGICAL INFORMATION:

Only acute studies have been performed on this product as formulated. The non-acute information pertains to the active ingredient, azinphos-methyl.

ACUTE TOXICITY
ORAL LD50.....: Male rat 75 mg/kg -- Female rat 55 mg/kg
DERMAL LD50.....: Female Rat: approx. 350 mg/kg
SENSITIZATION.....: Dermal sensitization studies have not been conducted on this formulation; however, the active ingredient, azinphos-methyl, is a

positive dermal sensitizer.

SUBCHRONIC TOXICITY...: Rabbits were treated dermally with the active ingredient, azinphos-methyl, for 6 hours/day, 5 days/week for 3 weeks at levels of 2 or 20 mg/kg. There was cholinesterase inhibition at the high dose. The no-observed-effect-level (NOEL) was 2 mg/kg. In a 12 week inhalation study, rats were exposed to azinphos-methyl at aerosol concentrations of 0.195, 1.24 or 4.72 mg/m3 for 6 hours/day, 5 days/week. Effects observed included reduced body weight gains and cholinesterase inhibition. The NOEL was 1.24 mg/m3.

CHRONIC TOXICITY.....: In a 1 year study, dogs were administered azinphos-methyl at dietary concentrations of 5, 25 or 125 ppm. Effects observed at the high dose included diarrhea, reduced body weight gains, elevated liver enzymes, and cholinesterase inhibition. The NOEL was 5 ppm based on cholinesterase inhibition. Rats were administered azinphos-methyl for 2 years at dietary concentrations of 5, 15, or 45 ppm. Effects observed included alopecia, reduced body weight gains, and cholinesterase inhibition. The NOEL based on cholinesterase inhibition was 5 ppm; the NOEL for all other effects was 15 ppm.

CARCINOGENICITY.....: Azinphos-methyl was investigated for carcinogenicity in chronic feeding studies using mice and rats at maximum levels of 40 and 45 ppm, respectively. There was no evidence of a carcinogenic potential observed in either species.

MUTAGENICITY.....: Several positive in vitro mutagenicity studies have been reported on azinphos-methyl. Negative results have been obtained in all in vivo studies conducted on azinphos-methyl.

DEVELOPMENTAL TOXICITY: In a developmental toxicity study, rats were administered azinphos-methyl by oral gavage during gestation at doses of 0.5, 1.0 or 2.0 mg/kg. The NOELs for maternal and developmental toxicity were 1.0 and 2.0 mg/kg, respectively. In a developmental toxicity study using rabbits, azinphos-methyl was administered by oral gavage during gestation at doses of 1, 2.5 or 6 mg/kg. The NOELs for maternal and developmental toxicity were 1 and 6 mg/kg, respectively.

REPRODUCTION.....: In a reproduction study using rats, azinphos-methyl was administered at dietary concentrations of 5, 15 or 45 ppm for 2 generations. Reproductive effects occurring in conjunction with maternal toxicity included decreased fertility, smaller litters, lower birth weights and reduced survival rates for pups. In a subsequent supplemental study, azinphos-methyl was administered at the same dose levels for 1 generation to investigate cholinesterase inhibition. The overall parental NOEL from these studies was less than 5 ppm based on cholinesterase inhibition. The reproductive NOEL was 5 ppm.

NEUROTOXICITY .....: In a delayed neurotoxicity study, azinphos-methyl was administered by oral gavage to hens at a single dose of 330 mg/kg. Treatment was repeated on day 21 and the hens were observed for an additional 3 weeks. There was no evidence of delayed neurotoxicity occurring in the treated hens. In an acute neurotoxicity study using rats, azinphos-methyl was administered as a single oral dose at analytically confirmed levels of 2, 6 or 13 mg/kg for males and 1, 3 or 6 mg/kg for females. Effects observed included cholinergic symptoms, cholinesterase inhibition, decreases in motor and locomotor activity (evident in the figure-eight maze), and mortality for both sexes at the highest dose. The NOEL for motor and locomotor activity was 2 and 3 mg/kg for

males and females, respectively. Excluding cholinergic responses, the NOEL for neurotoxicity was 13 mg/kg for males and 6 mg/kg for females, the highest doses tested. In a 13 week neurotoxicity study, azinphos-methyl was administered to rats at dietary concentrations of 15, 45 or 120 ppm for males and 15, 45 or 90 ppm for females. All clinical signs and neurobehavioral effects observed were ascribed to cholinergic toxicity, occurring at exposure levels that produced substantial inhibition of cholinesterase activity. There were no correlative micropathologic findings within the neural tissues or skeletal muscle. Excluding cholinergic responses, the NOEL for neurotoxicity was 120 ppm for males and 90 ppm for females (highest doses tested).

12. ECOLOGICAL INFORMATION:

This product is extremely toxic to fish and wildlife. Bayer will provide a summary of specific data upon written request. As with any pesticide, this product should be used according to label directions and should be kept out of streams, lakes and other aquatic habitats of concern. IN EVENT OF A SPILL EMERGENCY, CALL 1-800-414-0244.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD.....: Follow container label instructions for disposal of wastes generated during use in compliance with the FIFRA product label. In other situations, bury in an EPA-approved landfill or burn in an incinerator approved for pesticide destruction. Do not reuse container.
EMPTY CONTAINER PRECAUTIONS.: Do not reuse the container. Clean and empty containers should be disposed in accordance with state and local laws.

14. TRANSPORTATION INFORMATION:

TECHNICAL SHIPPING NAME.....: (Azinphos-methyl 22%)
FREIGHT CLASS BULK.....: Insecticides, NOI-NMFC 102100
FREIGHT CLASS PACKAGE.....: Insecticides, NOI-NMFC 102100
PRODUCT LABEL.....: Not Noted

DOT (DOMESTIC SURFACE)

PROPER SHIPPING NAME.....: Organophosphorus Pesticides, Liquid, Toxic, (Azinphos-methyl 22%), RQ *
HAZARD CLASS OR DIVISION .....: 6.1
UN/NA NUMBER.....: UN3018

14. TRANSPORTATION INFORMATION (Continued)

DOT (continued)

PACKAGING GROUP .....: PG II
DOT PRODUCT RQ lbs (kgs).....: 4.5 lbs (2.0 kgs)
HAZARD LABEL(s).....: Toxic
HAZARD PLACARD(s).....: Toxic

* Product becomes a Marine Pollutant when shipped in Bulk or Non-Bulk by water.

IMO / IMDG CODE (OCEAN)

PROPER SHIPPING NAME.....: Organophosphorus Pesticides, Liquid, Toxic (Azinphos-methyl 22%), RQ, Marine Pollutant
HAZARD CLASS DIVISION NUMBER...: 6.1
UN NUMBER.....: UN3018
PACKAGING GROUP.....: II
HAZARD LABEL(s).....: Toxic; Marine Pollutant (Marking)
HAZARD PLACARD(s).....: Toxic; Marine Pollutant

ICAO / IATA (AIR)

PROPER SHIPPING NAME.....: Organophosphorus Pesticides, Liquid, Toxic (Azinphos-methyl 22%), RQ
HAZARD CLASS DIVISION NUMBER...: 6.1
UN NUMBER.....: UN3018
SUBSIDIARY RISK.....: None
PACKING GROUP.....: II
HAZARD LABEL(s).....: Toxic
RADIOACTIVE?.....: Non-Radioactive

15. REGULATORY INFORMATION:

OSHA STATUS.....: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
TSCA STATUS.....: This product is exempt from TSCA Regulation under FIFRA Section 3 (2)(B)(ii) when used as a pesticide.
CERCLA REPORTABLE QUANTITY..: 4.5 pounds of the formulation which contains 1 pound of Guthion.
SARA TITLE III:
SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES..: Azinphos-methyl CAS #86-50-0 22%
SECTION 311/312 HAZARD CATEGORIES.....: Immediate Health Hazard; Delayed Health Hazard; Reactive Hazard
SECTION 313 TOXIC CHEMICALS.....: Naphthalene CAS #91-20-3 7-9%
RCRA STATUS.....: If discarded in its purchased form, this product would not be a hazardous waste either by listing

or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. (40 CFR 261.20-24)

16. OTHER INFORMATION:

NFPA 704M RATINGS:	Health	Flammability	Reactivity	Other
	2	2	2	

0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

Bayer's method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. NFPA ratings are provided by Bayer as a customer service.

REASON FOR ISSUE.....: Revise Sections 3; 4; 5 (Fire Fighting Procedures & Unusual Fire/Explosion Hazards); 7-15; revise ANSI format
PREPARED BY.....: V. C. Standart
APPROVED BY.....: D. C. Eberhart
TITLE.....: Product Safety Manager
APPROVAL DATE.....: 02/10/1998
SUPERSEDES DATE.....: 03/22/1995
MSDS NUMBER.....: 08298